National Aeronautics and
Space Administration

**Lyndon B. Johnson Space Center**
2101 NASA Road 1
Houston, Texas 77058-3696

May 24, 2005

Reply to Attn of: EA-05-039

Professor Samuel C. C. Ting
Massachusetts Institute of Technology
51 Vassar Street
Cambridge, MA 02139-4307

Dear Professor Ting:

As we discussed in the April Technical Interchange Meeting (TIM) in Geneva, our plan is to complete the preliminary copy of the Alpha Magnetic Spectrometer (AMS) Flight Safety Review Phase II Data Package by the end of June, 2005. At that point, the package will be ready for review by the collaboration. We intend to complete the package after the TIM in July, 2005.

With these dates in mind, we still have 35 action items outstanding. Since the April TIM we have attempted to close out these actions. We desperately need these actions closed by June 10, 2005 in order to complete the preliminary copy by the end of June. Please send all responses to Paul Nemeth, Mike Fohey, Chris Tutt, Leland Hill, and me.

The following people have actions assigned to them:

| | | |
|---|---|---|
| Roberto Battiston | Steve Harrison | Marco Molina |
| Ulrich Becker | Agnieszka Jacholkowska | Stefan Schael |
| Mike Capell | Klaus Luebelsmeyer | Reinhard Schlitt |
| Peter Fisher | Richard McMahon | Robin Stafford-Allen |
| Martina Green | Steve Milward | Johannes Van Es |

Trent D. Martin
NASA AMS Deputy Project Manager

Enclosure

EA-05-039

cc:
JSC/EA1/S. Porter
B2SC/P. Nemeth
B2SC/C. Tutt
B2SC/M. Fohey
B2SC/T. Urban
MIT/B. Hungerford
MIT/M. Capell
MIT/P. Fisher
MIT/U. Becker
MIT/M. Green
INFN/R. Battiston
RWTH/S. Schael
RWTH/K. Luebelsmeyer
SCL/S. Milward
SCL/S. Harrison
SCL/R. McMahon
SCL/R. Stafford-Allen
CGS/M. Molina
OHB/R. Schlitt
NLR/J. Van Es
UM/A. Jacholkowska

| ID | Reference | System | Assignee | Data Request | Status |
|---|---|---|---|---|---|
| 1 | AMS-02-F09 | TRD | Martina Green | Sent the AMS-02-F09 hazard report previously sent to Peter Fisher with request to review the hazard report and form 44 to provide updates and up to date graphics of the proportional tubes. | • Information Request sent 041905 |
| 2 | STD-AMS-02-F01 | TRD | Martina Green | Requested information on the pumps used within the TRD | • Email to Martina Green Summarizing data needs on 042105<br>• Included a redundant request on 050505 |
| 3 | STD-AMS-02-F01<br>AMS-02-F01<br>AMS-02-F10<br>AMS-02-F13<br>AMS-02-F05 | TRD | Martina Green | Indicated in summary the materials needs documented by Tim Schniepp for Gas Connector/VA tubes (specify materials), Fleece Fiber Radiator (needs Flammability Assessment Report), jumper cable (needs materials) and thermoelectrics (needs more product information) | • Email to Martina Green Summarizing data needs on 042105 |
| 4 | AMS-02-F05 | TRD | Martina Green | "I need the acceptance rationale as to why freezing of the TRD gases is acceptable. This includes the basic information on where it will freeze and when. Peter Fisher stated this in a meeting, but I never got it in writing and my memory isn't to be trusted when writing a Safety data package." | • Email to Martina Green Summarizing data needs on 042105 |
| 5 | AMS-02-F04<br>AMS-02-F05<br>AMS-02-F14 | TRD | Martina Green | I need the details for the locations and type of vents for all possible gas release locations on the TRD. | • Email to Martina Green Summarizing data needs on 042105<br>• Sent Redundant Request on 050505 |
| 6 | AMS-02-F05 | TCS-Zenith Radiator | Reinhard Schlitt | Cryocooler bypass valve design and implementation information is needed for the Phase II SDP | • This was established as a RID and action item at the recent design review according the Craig Clark. (Note from 041805)<br>• On 050205 Craig Clark forwards an email from R. Schlitt with the active portion of the system in a schematic.<br>• On 050405 I send an email asking for clarification of the extension of the reservoir volume below the bypass feed back into the reservoir, whether this is the fill and drain and if so how is it sealed. If not I ask for details. |
| 7 | AMS-02-F04 | Warm Helium Gas Supply | Richard McMahon | Request for information on the flow rate of the warm helium gas supply through burst disk in high pressure side. | • Email sent 031005 |
| 8 | AMS-02-F01<br>AMS-02-F14 | GPS | Agnieszka Jacholkowska | Request information on the EVA compatibility of the GPS antenna mounting and for EVA kick loads since the only viable mounting locations appear to be in EVA worksites and translation paths. | • Email Sent 042105 |

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| 9 | AMS-02-F08 | Avionics | Mike Capell | Update the high voltage table (provided) and increase the parsing of the table if necessary to include additional high voltage levels. | • Sent by email on 042105<br>• Receive email on 042205 indicating Capell is working on it.<br>• Parsing taken care of by L Hill on 0512, table still needs ??'s filled in.<br>• On 051605 M. Capell indicates that the ??'s will be addressed within two weeks (053005). |
| 10 | AMS-02-F03 | OLHP | J. Van Es | Could I get a brief description of the experiment hardware, including the description of the loop's planned construction, working fluid, quantity of fluid and a brief overview of it's operation. I am attaching a template for the pressurized systems we are going to try and put all the pressurized systems into, if you can provide any information for this template at this time I would greatly appreciate it. The quantity or perhaps maximum quantity of the working fluid that you could possible consider using. | • Email sent to J. Van Es on 050405 |
| 11 | AMS-02-F04<br>AMS-02-F06 | TRD | Martina Green | The TRD gas system has a "one day mix" tank, which is the D vessel. This tank which is filled to 300 psi, is supposed to be a controlled mix of Xenon and Carbon Dioxide. In Box S there is a valve controlled vent that can purge this system. I need to know what the operations and criteria will be for the use of this vent. The design of this vent (propulsive or non-propulsive with design details), and its location. | • Request sent by email on 050505 |
| 12 | AMS-02-F03,<br>AMS-02-F05 | TRD | Peter Fisher, Martina Green, Ulrich Becker, Klaus, Stefan Schael | Review and Update Pressure Systems Table for TRD | • Table, instructions and request went by email 051005 |
| 13 | AMS-02-F03,<br>AMS-02-F05 | Cryocooler LHP | Marco Molina, Reinhard Schlitt | Review and Update Pressure Systems Table for Cryocooler LHP | • Table, instructions and request went by email 051005<br>• Reinhard replied with information for update 051705, no operating pressures provided, request to review my changes and supply the missing values sent back on 051705 |
| 14 | AMS-02-F03,<br>AMS-02-F05 | Tracker Radiator | Marco Molina, Reinhard Schlitt | Review and Update Pressure Systems Table for Tracker Radiator | • Table, instructions and request went by email 051005<br>• Reinhard replied with information for update 051705, no operating pressures provided, request to review my changes and supply the missing values sent back on 051705 |

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| 15 | AMS-02-F03, AMS-02-F05 | Wake and Ram HP | Marco Molina, Reinhard Schlitt | Review and Update Pressure Systems Table for Crates (Wake and Ram) heat pipes | • Table, instructions and request went by email 051005<br>• Reinhard replied with information for update 051705, no operating pressures provided, request to review my changes and supply the missing values sent back on 051705 |
| 16 | AMS-02-F03, AMS-02-F05 | CAB HP | Marco Molina, Reinhard Schlitt | Review and Update Pressure Systems Table for CAB HP | • Table, instructions and request went by email 051005<br>• Reinhard replied with information for update 051705, no operating pressures provided, request to review my changes and supply the missing values sent back on 051705 |
| 17 | AMS-02-F03, AMS-02-F05 | CAB-USS HP | Marco Molina, Reinhard Schlitt | Review and Update Pressure Systems Table for CAB-USS HP | • Table, instructions and request went by email 051005<br>• Reinhard replied with information for update 051705, no operating pressures provided, request to review my changes and supply the missing values sent back on 051705 |
| 18 | AMS-02-F03, AMS-02-F05 | Oscillating Loop Heat Pipe | Johannes Van Es, Roberto Battiston | Review and Update Pressure Systems Table for Oscillating Loop Heat Pipe Experiment | • Table, instructions and request went by email 051005<br>• Informed on 051805 that the request was accounted for under the wrong names. Email was still sent to the appropriate individuals. |
| 19 | AMS-02-F03, AMS-02-F05 | TTCS | Johannes Van Es, Roberto Battiston | Review and Update Pressure Systems Table for TTCS | • Table, instructions and request went by email 051005 |
| 20 | AMS-02-F03, AMS-02-F05 | Cryomagnet | Stephen Harrison, Richard McMahon | Review and Update Pressure Systems Table for Cryomagnet | • Table, instructions and request went by email 051005 |
| 21 | AMS-02-F03, AMS-02-F05 | Warm Helium Gas Supply | Stephen Harrison, Richard McMahon | Review and Update Pressure Systems Table for Warm Helium Gas Supply | • Table, instructions and request went by email 051005 |
| 22 | AMS-02-F06 | Cryomagnet | Stephen Harrison, Richard McMahon | For each possible vent that is not controlled by a zero-thrust vent provide the quantity of gas and the nature of the vent orifice. Orientation and location of each vent is needed as well.<br><br>Also provide the locations and orientations of the zero-thrust vents that you previously provided graphics for. | • Email sent 051205. (This is not first request) |
| 23 | AMS-02-F06 | Warm Helium Gas Supply | Stephen Harrison, Richard McMahon | Please provide details of the vent locations, type of vent used for each of the possible vent locations on the warm helium gas supply. This is needed to address the hazards of plume impingement, and possible overturning moments/thrust. Nominally it will be expected that all these possible vent locations be equipped | • Email sent 051205. |

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| | | | | with zero thrust vents such as those shown associate with the cryomagnet systems. | |
| 24 | AMS-02-F04<br>AMS-02-F06 | TRD | Peter Fisher, Martina Green, Ulrich Becker, Klaus, Stefan Schael | Please provide information on the fill and drain point of each system, how that is sealed against leakage and if it is sealed in some manner other than welding, provide information on the actual sealing mechanism and each seal. This should consider cutaway diagrams of such diagrams that show each of the seals. This data is needed for each of the systems, and includes Ground servicing interfaces that may exist that are closed off for flight. | • Previously requested, new request sent 051305 |
| 25 | AMS-02-F04<br>AMS-02-F06<br>AMS-02-F10 | Cryocooler LHP | Marco Molina, Reinhard Schlitt | Please provide information on the fill and drain point of each system, how that is sealed against leakage and if it is sealed in some manner other than welding, provide information on the actual sealing mechanism and each seal. This should consider cutaway diagrams of such diagrams that show each of the seals. This data is needed for each of the systems, and includes Ground servicing interfaces that may exist that are closed off for flight. | • Previously requested, new request sent 051305 |
| 26 | AMS-02-F04<br>AMS-02-F06<br>AMS-02-F10 | Tracker Radiator | Marco Molina, Reinhard Schlitt | Please provide information on the fill and drain point of each system, how that is sealed against leakage and if it is sealed in some manner other than welding, provide information on the actual sealing mechanism and each seal. This should consider cutaway diagrams of such diagrams that show each of the seals. This data is needed for each of the systems, and includes Ground servicing interfaces that may exist that are closed off for flight. | • Previously requested, new request sent 051305 |
| 27 | AMS-02-F04<br>AMS-02-F06<br>AMS-02-F10 | Wake and Ram HP | Marco Molina, Reinhard Schlitt | Please provide information on the fill and drain point of each system, how that is sealed against leakage and if it is sealed in some manner other than welding, provide information on the actual sealing mechanism and each seal. This should consider cutaway diagrams of such diagrams that show each of the seals. This data is needed for each of the systems, and includes Ground servicing interfaces that may exist that are closed off for flight. | • Previously requested, new request sent 051305 |
| 28 | AMS-02-F04 | CAB HP | Marco Molina, | Please provide information on the fill and drain | • Previously requested, new request sent 051305 |

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| | AMS-02-F06<br>AMS-02-F10 | | Reinhard Schlitt | point of each system, how that is sealed against leakage and if it is sealed in some manner other than welding, provide information on the actual sealing mechanism and each seal. This should consider cutaway diagrams of such diagrams that show each of the seals. This data is needed for each of the systems, and includes Ground servicing interfaces that may exist that are closed off for flight. | |
| 29 | AMS-02-F04<br>AMS-02-F06<br>AMS-02-F10 | CAB-USS HP | Marco Molina, Reinhard Schlitt | Please provide information on the fill and drain point of each system, how that is sealed against leakage and if it is sealed in some manner other than welding, provide information on the actual sealing mechanism and each seal. This should consider cutaway diagrams of such diagrams that show each of the seals. This data is needed for each of the systems, and includes Ground servicing interfaces that may exist that are closed off for flight. | • Previously requested, new request sent 051305 |
| 30 | AMS-02-F04<br>AMS-02-F06<br>AMS-02-F10 | Oscillating Loop Heat Pipe | Johannes Van Es, Roberto Battiston | Please provide information on the fill and drain point of each system, how that is sealed against leakage and if it is sealed in some manner other than welding, provide information on the actual sealing mechanism and each seal. This should consider cutaway diagrams of such diagrams that show each of the seals. This data is needed for each of the systems, and includes Ground servicing interfaces that may exist that are closed off for flight. | • Previously requested, new request sent 051305<br>• Informed on 051805 that the request was accounted for under the wrong names. Email was still sent to the appropriate individuals. |
| 31 | AMS-02-F04<br>AMS-02-F06 | TTCS | Johannes Van Es, Roberto Battiston | Please provide information on the fill and drain point of each system, how that is sealed against leakage and if it is sealed in some manner other than welding, provide information on the actual sealing mechanism and each seal. This should consider cutaway diagrams of such diagrams that show each of the seals. This data is needed for each of the systems, and includes Ground servicing interfaces that may exist that are closed off for flight. | • Previously requested, new request sent 051305 |
| 32 | AMS-02-F04<br>AMS-02-F06 | Cryomagnet | Stephen Harrison, Richard McMahon | Please provide information on the fill and drain point of each system, how that is sealed against leakage and if it is sealed in some manner other than welding, provide information on the actual | • Previously requested, new request sent 051305<br>• Reviewed previous data and sent specific comments and requests on 051305 pm |

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| | | | | sealing mechanism and each seal. This should consider cutaway diagrams of such diagrams that show each of the seals. This data is needed for each of the systems, and includes Ground servicing interfaces that may exist that are closed off for flight. | |
| 33 | AMS-02-F04<br>AMS-02-F06 | Warm Helium Gas Supply | Stephen Harrison, Richard McMahon | Please provide information on the fill and drain point of each system, how that is sealed against leakage and if it is sealed in some manner other than welding, provide information on the actual sealing mechanism and each seal. This should consider cutaway diagrams of such diagrams that show each of the seals. This data is needed for each of the systems, and includes Ground servicing interfaces that may exist that are closed off for flight. | • Previously requested, new request sent 051305 am<br>• Reviewed previous data and sent specific comments with graphic and requests on 051305 pm |
| 34 | AMS-02-F01 | Cryomagnet | Stephen Harrison, Richard McMahon, Robin Stafford-Allen, Steve Milward | Requested a status of the eddy current and induced loads analysis that was indicated at the October 2004 TIM to be accomplished. The possibilities of inducing loads in the AMS-02 systems needs to be addressed in the Phase II safety data package. | • Sent reminder of October TIM action on 051905 |
| 35 | AMS-02-F01<br>AMS-02-F15 | Cryomagnet | Stephen Harrison, Richard McMahon, Robin Stafford-Allen, Steve Milward | As hardware could also be the source of the liquification and freezing, in addition to GSE, while in the Orbiter Payload Bay we need understand the rationale why this is not going to be occurring or the approach that we should rely upon to keep the cryomagnet from affecting the ambient atmosphere and creating a concern of frozen or liquefied air. | • Sent reminder of October TIM action on 051905 |